
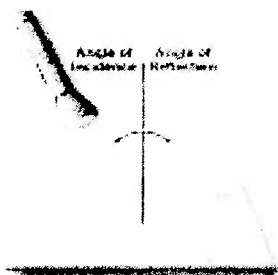


## LIGHT ENERGY

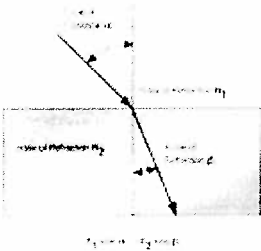
### MAIN IDEAS

The following is a summary of the content for the unit on light.

#### PROPERTIES OF LIGHT:

1. Light is a form of radiant energy that travels in transverse waves in tiny particles called photons.
2. Light waves travel in straight lines called rays.
3. The speed of light is: 186,000 miles per second = 300,000 m/sec = 300,000,000 m/sec.
  - Nothing moves faster than the speed of light. In the time it takes you to say "one hundred one" light can travel a distance equal to 7 orbits around the earth.
4. Light can travel through a vacuum.
5. When light strikes a surface, some light is **reflected**, some light is **absorbed**, and some may be **transmitted**.
  - a. Reflection – part of a sound or light wave that bounces off a surface, such as a wall or mirror; the color of an object depends on the light waves it reflects.
    - i. **The law of reflection** says that the angle at which a light ray strikes a flat surface is equal to the angle the reflected ray makes with the same flat surface. The angle of incidence = the angle of reflection.
    - ii. **Diffusion** – if light travels only in straight lines, how is it that light comes through our windows even when it is not shining directly through them? This is due to the particles of dust and water vapor in our atmosphere. Light that strikes the dust and vapor is scattered and reflected in many different directions. This scattering is called diffusion. Diffused light allows us to see inside the shadow of a tree or other object.
  - b. **Absorption** – the loss of energy when a sound or light strikes a surface; absorption reduces the loudness of sound and the brightness of light.

- c. **Transmitted light** – light which passes through a medium, such as the sunlight that passes through a window
- This medium can be **transparent** (see through clearly, such as clear glass) or **translucent** (see through with some distortion, such as frosted glass).
  - Light cannot pass through **opaque** objects.
  - When light passes through a different medium, it bends or **refracts**.
- d. **Refraction** – the bending of light rays as they pass from one medium to another with a different density such as from air into glass



- The law of refraction says that when a light ray enters from the air into another matter, such as glass or water, its speed decreases and it bends *toward* the normal line (the line that is 90 degrees to the surface that a light ray strikes). When a light ray leaves a material and reenters the air, its speed increases and it bends away from the normal line.

6. The color of light comes from its wavelength. White light is a combination of all the colors. White light can be separated into its component colors by using a prism.
- Frequency = the number of wavelengths/sec
  - The colors of the rainbow in order of increasing frequencies are: red, orange, yellow, green, blue, indigo, and violet ROY G BIV
  - Black is the absence of any visible light.

